THE HOME PREGNANCY TEST: A FEMINIST TECHNOLOGY?

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In the United States, one of the primary ways that the feminist movement has worked to overcome gender bias has been through changes in the law and public policy. Technologies are "forms of legislation" (Winner 1977) that have not yet received the level of feminist attention they deserve.[1] As Winner observed, "Just as surely as . . . the laws and regulations of government, technological design is a place where some basic decisions are made about the identities and relationships, power and status, life chances and limits upon these chances" (2002, 1). Hence, it is important to work toward the achievement of feminist technologies (Layne, forthcoming).

In this essay, I examine the home pregnancy test as a candidate for feminist technology. Home pregnancy tests have been promoted and greeted as libratory for women. They are relatively low cost and easy for women in the United States to obtain and use. In addition, they are noninvasive, pose no apparent health risks, and boast high levels of accuracy. In other words, they appear to be the very type of technology advocated by the women's health movement and by science and technology studies scholars who seek more democratic design and use of technoscience. Yet examination of ninety-two first-person accounts of use posted between 2003 and 2005 as part of a U.S. National Institutes of Health (NIH) project on the history of the test, accounts published on a pregnancy website, and the newsletters of two U.S. pregnancy loss support organizations spanning the period of 1981–2004 suggest that the presumed benefits of this technology are not so clear.[2] In fact, there are a number of hidden costs that come into relief when we examine how and by whom they are used. I conclude that home pregnancy tests do not offer women the benefits they purport to and, in fact, in some ways they disempower women by deskilling them, devaluing their self-knowledge, and enticing them to squander their buying power on frivolous consumer products. Despite all this, home pregnancy tests may be of value to some women in some circumstances, and thus, these information technologies should be improved to better serve women.

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HISTORY OF THE HOME PREGNANCY TEST

The technical breakthrough that makes the home pregnancy test possible was made by researchers at the NIH in 1972, when abortion was still illegal in the United States.[3] At that time there were four ways of testing for early pregnancy: a urine test, a blood test, a hormone withdrawal test that was banned by the U.S. Federal Drug Administration (FDA) in 1975, and a pelvic exam. These could be done by "doctors, midwives, nurse-practitioners, [or] physicians' assistants" at their offices or "at family-planning organizations, women's health centers and abortion clinics" (Boston Women's Health Book Collective [BWHBC] 1976). In 1976, the FDA approved four home pregnancy tests that were deemed "substantially equivalent" and by 1977, the product e.p.t. had reached the market. It consisted of "a vial of purified water, a test tube containing, among other things, sheep red blood cells . . . as well as a medicine dropper and clear plastic support for the test tube, with an angled mirror at the bottom"; required the first urine sample of the day; and took about two hours to work. One woman who used the test in 1983 when she was sixteen and living at home with her parents remembers having "to set it up in my cupboard very carefully so it wouldn't be discovered or knocked over." A woman who used a test in 1989 recalls, "It was NOT easy to use. . . . You pretty much felt like a chemist. . . . There were droppers to put drops of urine into a tube, you had to shake it up and then put this stick with little white beads in the end into the tube and wait something like 10 or 15 mins."

These products have multiplied over the years; in 2003, a website offered a comparison of fifty-two different brands that were available in the United Kingdom or the United States (Fertility Plus 2003). The tests have been improved and have "gotten easier and easier."

USERS

Feminist scholars have been instrumental in expanding technology studies scholarship to include users. This turn to "the consumption junction" is attributed to Cowan's work in the late 1970s on domestic technologies. Since then, many technology studies scholars have examined how women and men actually use technologies. More recently, attention is also being given to how "presumed users" are "configured" during the design process and by journalists and people working in the public sector (Oudshoorn and Pinch 2005, 8–9 on the work of Woolgar, Akrich, van Kammen, and Epstein). Another relatively new interest is in how users can act as "agents

of technological change" by "appropriating" technologies and using them for their own purposes. Feminist scholars have also been particularly attentive to the diversity of users (Oudshoorn and Pinch 2005). In this essay, I discuss the presumed and actual users of home pregnancy tests, drawing attention to differences between users, including those who have a pregnancy loss.

At first, the presumed users seem clear: the tests are designed for women—but not all women, only those who are potentially pregnant. Even within the category of "possibly pregnant women," we find fundamental differences. In fact, there are two very different sets of presumed users, women who wish to be pregnant and those who do not. This raises interesting design issues, since a single product is intended for users who have opposite goals. What these two sets of users share is a perceived "need to know," and this points to the fact that home pregnancy tests are fundamentally information technologies.

Presumed and actual users are socially and physically diverse, encompassing women from all walks of life, classes, and ethnic backgrounds and a wide range of ages; in the United States, they are expected to speak either English or Spanish.[4] Furthermore, of those who use the test, some are pregnant and some are not. Of those who are pregnant, regardless of whether they are in the want-to-be-pregnant or don't-want-to-be-pregnant group, some will have viable pregnancies and others won't. In other words, some of those who are thrilled to learn they are pregnant will suffer a pregnancy loss (the rate is 15–20 percent, with an additional 10 percent loss rate during the days between conception and first missed menses) (Wilcox et al. 1988), and of those who are dismayed to learn they are pregnant and undergo an abortion, the same proportion (15–20 percent) would have lost the pregnancy naturally anyway.

Furthermore, women are not the only individuals who become involved in the use of these tests. First-person and fictional accounts of pregnancy test use regularly feature men who go out to buy the tests; hover nearby while they are being used; are consulted for interpretation of the results; and are consulted, or not, on how to proceed, given the results. These men are generally sexual partners, including spouses, but in one of the accounts posted on the NIH website a father tells of going out to buy a third test, since he was sure his daughter could not be pregnant. More typical is Greg, who reports that "we purchased" the test, "we followed the instructions," and "discover[ed] that we were pregnant. We were overjoyed." In Swain's

fictional account, the heroine's partner, Eddie, runs out to the store and returns with three tests, folic acid, and a fake rose, then stands outside the door shouting instructions about how to use it ("Only pee on it for five seconds. . . . Lay it flat. On a sink. . . . Don't hold it up") and pesters her with questions ("Are you done yet?" "Everything go ok?") (2004, 62–63).

THE PURPORTED BENEFITS OF THE HOME PREGNANCY TEST

By and large, feminists have embraced the home pregnancy test. The 1984 edition of *Our Bodies, Ourselves*, the first to be published after the advent of home tests in the United States, observed that some women "feel isolated doing a home test," but others "appreciate the option of a home pregnancy test because it gives privacy, convenience and control over the experience" (BWHBC 1984, 285). The authors mention two advantages to "find[ing] out early. If you want to have a baby, you can take extra good care of yourself. If you decide not to continue the pregnancy, you can get an early abortion" (284). Another early proponent of these kits asserted that they would "help women gain the control over their bodies which is their right"; further, she noted the importance of having these products "available over-the-counter so that we are not dependent on medical super-structures for confirmation of the outcomes of our own reproductive choices" (Oakley 1976, 502). A 1978 *Mademoiselle* article evaluating e.p.t. observed that a home test spares women having to "wait several . . . weeks for a doctor's confirmation"; offers more "privacy"; "gives you a chance, if pregnant, to start taking care of yourself"; "or to consider the possibility of early abortion" (Leavitt 2005). In the following sections, I will probe these purported benefits.

PROVIDING KNOWLEDGE DIRECTLY TO WOMEN

At first glance, it appears that a home pregnancy test takes power/knowledge out of the domain of experts and places it in the hands of women. Notably, opposition to these kits came from professional laboratory technicians who saw the tests as undermining their authority. However, despite the fact that these tests boast a very high accuracy level, accounts by users and representations of use in popular culture indicate that they are not considered authoritative. Authoritative knowledge is "the knowledge that participants agree counts in a particular situation that they see as consequential, on the basis of which they make decisions and provide justifications for courses of action. It is the knowledge that within a community is considered legitimate, [and] official" (Jordan 1993 [1978], 152–54).

Women often do not trust the results of the test, either because they believe the product may be flawed or fear they have erred in using it and so perform repeat tests. Most of the people who contributed to Leavitt's (2005) NIH history project tell of using multiple tests. One woman reports, "When I got the result, I didn't believe it. So I had him go to the store and get a different brand and I took it and it was positive, then I said, 'Take me to Planned Parenthood.' I had three different types of tests in one day and all came out positive so I had to realize that day that I was pregnant."

The most dramatic public example of multiple test use occurred in 1991 on *Murphy Brown*, a popular American television comedy on which a young, single, professional woman has a baby. Over the course of two episodes Murphy Brown takes twenty tests, all of which are positive (Leavitt 2005). Another is found in the opening scene of the 2007 Oscar-winning movie *Juno* in which an unwed woman openly uses multiple positive tests in her town's general store.

Women sometimes doubt their own perceptions and question their ability to accurately read the home test results. For example, Teresa-Lynn, a writer on the website Baby Corner, begins her pregnancy journal with "Is that a line? Does this look like a line? I think I see a line, do you see a line???? Those were my first stuttered out shocked words as I stared at one of the home pregnancy tests. . . . I used the 2nd test 5 minutes later. Again 'Is this a line? DOES THIS LOOK LIKE A PINK LINE?' I'm never buying those cheap, 'a second pink line means you're pregnant' tests again. We all determined it WAS a second pink line and not my imagination" (Baby Corner 2002).

Regardless of how many home pregnancy tests are performed, or what the results are, such tests are not considered authoritative by the test manufacturers, by women, or by health care providers. Manufacturers advise, women seek, and doctors insist on confirmation by another test done at the doctor's office. Jennifer Fisher describes how, after discovering that she was pregnant through using a test at home, she "went to the doctor for confirmation. Sure enough, I was pregnant" (2002). Teresa Lynn "still wondered if that 2nd pink line wasn't some sort of trick of the light, but a blood test the next day revealed it was a pink line!" (Baby Corner 2002).

Thus, what had in the past been "learning," or "discovering," or "figuring out" that one was pregnant has become a multistep, technologically dependent, diagnostic process. It is not just that missed menses and other bodily changes are no longer considered a reliable source of knowledge. Now, not one, but two, and often more, scientific tests are undertaken. Home

diagnostic kits do not replace doctors' tests, they are just an additional, prior step and represent yet another instance of increasing pregnancy-related consumption (Taylor 2000a, 2000b, 2008; Taylor, Layne, and Wozniak 2004). Clearly, these tests are profitable for the global pharmaceutical companies that produce them. My local pharmacy offers six varieties, ranging in price from $8.49 for a single test in its own brand, to $17.39 for a digital name brand, to a whopping $21.99 for a "value pack" of two digitals.[5]

The knowledge that such tests provide is of a distinct type: it is biomedical knowledge. The kits are, after all, "diagnostic" tests. As Nelkin and Tancredi remark in *Dangerous Diagnostics*, diagnostic tests "are widely accepted as neutral, necessary, and benign," when, in fact, "information from tests is not always beneficial or even benign" (1994, 10, 7).

The information that home pregnancy tests provide is at once reductionist and universalist. A woman's becoming pregnant (the implantation of a fertilized egg in her womb) begins a series of complex physiological changes. These changes are multiple and incremental. Home pregnancy tests fragment, isolate, identify, and measure a single element of these changes. In fact, they measure only a part of one of these elements (the beta-subunit of one hormone). They also universalize—the positive results, that one is "pregnant," suggest that pregnancy is a single thing. But pregnancies are not equal, not even physiologically. A pregnancy test only diagnoses a chemical pregnancy, not a physiological one. Many pregnancies, including pregnancies involving a blighted ovum or a molar pregnancy, do not involve the development of an embryo/fetus, but produce hCG, what is known as "the pregnancy hormone," nonetheless. One woman explains her "mixed feelings about the early tests because they allow you to get positive results, only to learn it is really a chemical pregnancy or 'early miscarriage.'"

PROVISION OF PRIVACY

The home pregnancy test means that women can find out if they are pregnant without their doctor knowing. While this would have been more significant during the era of illegal abortion, it may still be a factor for some women who are considering abortion, especially in small towns. One woman tells of how right after completing college she "didn't want to go to my own doctor for reasons of privacy" so traveled to "an abortion clinic."

But as first-person accounts by test users and popular culture depictions make clear, home pregnancy tests do not eliminate privacy issues. In fact, the procurement, use, and disposal of home pregnancy tests open up the pos-

sibility of exposure to a greater number and variety of people than a visit to a doctor's office or clinic.

Many of the contributors to the NIH website describe the risk of public exposure. A single woman from the Midwest relates, "I live in a small town and know a lot of people. I refused to go to WalMart because I just knew that I would run into someone I knew. I went out of town to get them." One woman reports that she took a test at 4:30 in the morning because at the time she was "living in an ancient college dorm with community bathrooms" and she wanted to "ensure that she would be alone." She had purchased the test on the Internet and was pleased that it "came in the mail anonymously and the charge on my credit card was also fairly anonymous." One woman recalls that, at age nineteen, she contemplated stealing a test because she was embarrassed "to be buying just that one item and didn't have the money to buy anything else." Several women report receiving unwanted comments from the cashier. One woman remembers, "The guy that rang it up for us asked us if we hope it's positive, which I thought was none of his business." Another reports that the clerk assumed she hoped for positive results and "there was an odd discussion in which she was wishing me luck and encouraging me to come back in with the baby, and I was dying to get home and get negative results."

In seven of the twenty-three television episodes involving home pregnancy tests described by Leavitt (2005), the test is discovered in the trash by parents, partners, or friends. These fictional depictions are apparently influencing user behavior. One woman explains, "I threw away the results in the outside trash, not inside, lest I suffer like all those women on tv whose family members 'find' their pregnancy tests in the trash."

Why, and to whom, is privacy important? Most of those who report being concerned about privacy do not want to be pregnant. The nineteen-year-old who contemplated stealing the test "cried alone for two hours" when the result was positive. A woman who preferred an anonymous drugstore employee over her doctor was single, living at home with her mother, between jobs, "absolutely poor," and without health insurance, when she woke up naked in bed with a man one morning after a party. The test was positive and she had an abortion.

In contrast, women who wish to be pregnant often report being eager to announce the news of their pregnancy. One married woman remembers feeling "proud as I stood in the test aisle and took a great deal of time reading all of the boxes to see which one would give me the most accurate

result" (in contrast with how embarrassed she had felt twelve years earlier when she was single and possibly pregnant by someone other than her boyfriend). Sometimes women employ a used test stick as an announcement. On Valentine's Day, one woman "secretly took a home pregnancy test and got a big positive. I presented the test to my husband as a V. Day gift." A man tells of coming downstairs one morning to be greeted by his wife "with a big smile and a home pregnancy tester wrapped in a bow." Others report keeping the used stick as a cherished memento for the baby book.[6]

FASTER, FASTER, FASTER

Advertising for home pregnancy tests stresses how fast a product can detect a pregnancy. In 2008, all six brands for sale in my local pharmacy boasted, in large print on the packages, test results that were available "5 days sooner!" than a missed period *and* that were "over 99% accurate," despite accuracy rates for the five-days-sooner diagnosis being only 53 percent.[7]

Does such early diagnosis really benefit women? Emphatically, no, if there is only a fifty-fifty chance of getting an accurate result at the earliest date advertised by the test makers. Rather than waste their money, women might just as well flip a coin.

How about the tests that, if used after the first day of a missed period, have an accuracy rate of 90–99 percent? Early supporters of the test argued that "earlier diagnosis of pregnancy" would result in "earlier prenatal care and earlier abortion, thereby contributing to better maternal health" (Baker et al. 1976, 167). Have they done so? And how early is optimal, and how early is early enough?

EARLIER PRENATAL CARE?

Class and racial differences loom large in this regard. In the United States, maternal mortality is three to four times higher for black women than for white. This difference is most apparent in pregnancies that do not end in a live birth, since without proper medical care women can die from ectopic pregnancy, spontaneous and induced abortions, and gestational trophoblastic disease (Cunningham et al. 2001, 8–9). Much of this disparity is thought to be the result of "poor availability of medical care for minority women," which in turn is linked to "the erosion of health-care safety nets for the uninsured" (10–11).

There are better outcomes in pregnancies when there is "early and consistent prenatal care" (Winston and Oths 2000, 134). Prenatal care may ben-

efit patients by detecting and managing serious problems such as gestation hypertension and diabetes or by providing patient education about risky health behaviors such as smoking and drinking (134).

But there is no evidence that home pregnancy tests have in fact had the desired effect. Despite the phenomenal growth in sales over the past thirty years, nearly one-fifth of women in the U.S. received no prenatal care during the first trimester in 2005 (Martin et al. 2007). For middle-class women, it is not clear that there is a need for earlier prenatal care. In fact, because of the high rate of pregnancy loss in the earliest weeks, some obstetrical practices will not begin prenatal care until after a heartbeat has been discerned, that is, not before six to eight weeks gestation. In my view, preconception-care visits, at which potential problems such as hypertension, diabetes, and Rh factor can be addressed; prenatal vitamins prescribed; and information on miscarriage provided (Layne 2006a, 2006b, 2007) would be more beneficial. For women who are already "taking care of themselves," there may be physical and psychological advantages to taking a more wait-and-see attitude.

Earlier and more intensive medical management of pregnancy encourages earlier and more intensive social construction of fetal personhood in wished-for pregnancies and the view of pregnancy as something that can and should be controlled. In the past, as Duden tells us, physiological changes in a woman's body were "signs and intimations" of a pregnancy; one could never be sure that one was going to have a baby; "it remain[ed] a hope" (1993, 9). But during the last quarter of the twentieth century, "hope . . . dissolved into expectations that can be managed at will" (10). The innocent-looking home pregnancy test is, in fact, one of the technologies that has contributed to this epistemic shift. Women whose pregnancies end in loss suffer as a result (both at the moment of loss and during subsequent pregnancies).

EARLIER ABORTIONS?

In the United States, abortion is legal until twenty-four-weeks gestation. Thus, from a legal point of view, any time before the twenty-fourth week is early enough. But there are a variety of procedures, and these differ depending on how far along one is, and where and by whom one is being seen. Planned Parenthood (n.d.) offers two choices up to nine weeks—medicated and vacuum aspiration—and vacuum aspiration after nine weeks. Although practice varies from clinic to clinic, overall, one has more options during the first trimester (first twelve weeks) than after, and there may be some health advantages to first-trimester abortions. There is no magic cutoff point after

which it is unsafe to have a legal abortion. Thus, one answer to the question of how early is early enough for a first-trimester abortion.

Let us work from the other direction too. Of all confirmed pregnancies, 15–20 percent end in spontaneous abortion (the rate is even higher for young teens, a population for whom pregnancies are often unwanted), and since most of these occur in the first weeks of pregnancy, might there not be advantages to testing somewhat later, for example, two or three weeks after an expected period? Furthermore, since the very highest rate of miscarriage occurs between fertilization and the first missed menses (accounting for an additional 10 percent), does it not make sense to wait *at least* until the first missed menses? Baker and others recognized that false positives "could cause the woman unnecessary psychological stress and expose her to the expense and potential risk of an unnecessary . . . abortion" (1976, 167). Earlier and earlier diagnosis subjects women to the same unnecessary risks.

WHOM DO HOME PREGNANCY TESTS BENEFIT?

Home pregnancy tests clearly benefit the pharmaceutical companies that manufacture them. In 1997, home pregnancy tests in the United States alone accounted for $206 million in sales. In 2007, the profits of the U.S. company Church and Dwight (a manufacturer of personal care products founded in 1846 and the leading U.S. producer of baking soda) rose 14 percent, to $2,220.9 million, largely based on growth in sales of their First Response pregnancy kits and Trojan condoms (Star-Ledger 2008). Despite the appearance of their giving women more autonomy, home pregnancy tests, in fact, create a new technology/consumer/pharmacological dependency.

These tests are also being marshaled to promote other such dependencies under the guise of facilitating women's control over their own bodies. Ovulation-predictor kits are manufactured by the same companies that make home pregnancy tests. The insert in the First Response pregnancy test advises women who want to be pregnant but received a negative test result to use one of their "First Response Easy-Read Ovulation Test kits, an at-home, one-step" hormonal test, so "you can . . . get pregnant sooner." The test includes coupons for ovulation kits and more pregnancy tests.

In addition, home pregnancy tests are being used to promote menstruation-suppressing birth control pills (Aegnst and Layne forthcoming). Proponents of menstruation-suppressing birth control pills argue that the week of placebo pills in classic oral contraceptives was included to reassure women that they were not pregnant, but now, since that is "easily handled . . . with

home pregnancy urine dipsticks," this obstacle to the spread of extended-regimen pills has been eliminated (Thomas and Ellertson 2000, 923).

Home pregnancy tests also benefit the stores that sell them. A 1991 article in *Drug Store News* reported that pregnancy test sales in drug stores had "surged 450% from 1982–1989. Ovulation predictors have continued to grow an average of 70% since 1986." The authors instruct drug stores in how to optimize "your share of this high profit margin category" by increasing shelf space and locating the tests in "one convenient Family Planning Center," which will increase "the likelihood of multiple purchases among companion products" (Drug Store News 1991).

Do these products benefit women too? The answer would be yes if the tests lead to improved maternal/fetal health or to safer abortions. In order to know what the actual health benefits or deficits of home testing are, one would need to know: Do women who do not wish to be pregnant actually get earlier abortions? If so, how much earlier, and are there significant health benefits because of the time difference? Do women who wish to be pregnant actually get earlier prenatal care? If so, how much earlier, and does the time difference actually account for improved health of women or their embryo/fetus? But these remain unasked and unanswered empirical questions. This, in turn, raises the question of *why*.

What about women who find they are not pregnant? A study of teen users suggests that the availability of such tests at home is reducing the ability of health care providers to offer family planning counseling to at-risk teenage girls (Shew et al. 2000, 974). This study found that teenage girls who used home tests were less likely than the control group to be using effective birth control methods, and since most of those who got negative results did not follow up with a clinician, the kits reduced "provider access to at-risk youth for pregnancy prevention counseling."

One of the expected advantages of home pregnancy tests was "allowing a woman to be the first person to know that she is pregnant" (Baker et al. 1976). This view ignores the fact that in the past women *were* the first to know, albeit via different means. In contrast, by externalizing an internal bodily state, home pregnancy tests make this information readable not only to the woman but also to others. Home pregnancy kits greatly extend the number and kinds of people who might know that a woman believes she may be pregnant; among them are members of the public, such as cashiers or people who witness a woman buying the product or who find the test in their home or in the trash. It also makes this information more readily

available to the men in women's lives. While most women who shared their stories on the NIH website welcomed their sexual partner's involvement, one report offers a sobering reminder that such involvement is not always a good thing. A twenty-four-year-old recalls using a test when she was seventeen, still living at home with her family, and involved in an abusive relationship. Her boyfriend "sat down in the middle of [a store] . . . and opened up the package. He laid out the instructions all over the floor and told me to go pee on it and bring it straight back to him. He told me he wanted to make sure I didn't tamper with it. . . . I did what he asked. . . . I wasn't allowed to see the test, and he kept it with him."

A FEMINIST HOME PREGNANCY TEST

Being able to tell whether one is pregnant is clearly of value to women. There are several ways to gain this knowledge, including some that do not involve the purchase of a single-use disposable product.

Before the advent of early pregnancy testing, women learned they were pregnant by noticing changes in their body. According to a 1973 study of the thirty-three women who came to a Feminist Women's Health Center in California suspecting a possible pregnancy, twenty-eight were "convinced" that they knew whether they were pregnant on the basis of changes in their body (breast changes being the most frequently mentioned, followed by missed menses, nausea, fatigue, and many idiosyncratic symptoms that women reported having experienced during previous pregnancies). Of these, all but one were correct (the only one who mistakenly thought she was pregnant had been taking hCG as an obesity treatment; it causes women to feel pregnant and may result in a positive pregnancy test) (Jordan 1977, 21). In addition, four of the five who "suspected" they were pregnant but weren't entirely sure were, in fact, pregnant (again, the only one who wasn't had been taking hCG for weight loss). In other words, competence to accurately self-diagnose early pregnancy on the basis of embodied experience was "massively present" (Jordan 1977).

Many of the women who contributed to the NIH website also reported that they possessed self-knowledge of what the test would show. For instance, one woman writes, "I kind of had a feeling of what the results would be. My reaction was just confirmation. Kind of like I knew it." And another woman reports, "I was so hungry all of a sudden, I KNEW something was up." One woman who did not want to be pregnant but had been when she was seventeen remembers "the feeling of dread waiting for the color to turn. . . .

I knew I was pregnant but that damn little test would confirm all my worst fears." Another woman, "fresh out of college," writes, "I knew I was pregnant before I even took the test."

Of course, not everyone recognizes when she is pregnant, even if she has been pregnant before.[8] One woman who turned out to be pregnant was thirty-two and at home with eighteen-month-old twins who were the product of assisted fertility technologies. She explains that her husband bought the test for her because "I didn't think I could be pregnant." A forty-five-year-old woman who also was surprised to learn she was pregnant said, "I thought I knew my body well; you think you've got it covered. I was tired a lot and my period was light, but I didn't even consider it." Until "a colleague asked, 'Could you be pregnant?'" (BWHBC 2005, 383).

As *Our Bodies, Ourselves* explains, "Culture and family upbringing may influence how we interpret the changes in our body. Many of us think we have digestive problems, stress, or the flu. Some of us have taken so many risks without conceiving, or tried for so long without luck, that we think we are infertile. For some of us, it is unthinkable, and we just do not accept the signs. For others, we do not want to make decisions about the pregnancy so we wait until we are so far along that our options are limited" (384).

Nevertheless, this valuable self-knowledge should be recognized and cultivated as an important feminist means of detecting a pregnancy, one that offers several advantages over home testing. Unlike the false claims of home pregnancy tests, this method enhances women's autonomy and maximizes privacy—no one needs to know until the woman deems it appropriate. Furthermore, it doesn't cost anything. If the pervasive adoption of home pregnancy testing has resulted in women losing the skill to detect their own pregnancies, this is something that can and should be regained.[9]

Another feminist method to determine if one is pregnant is by doing a pelvic self-exam or helping a friend do one. One contributor to the NIH website recalls having had a "plastic speculum around from the do-it-yourself pelvic exam days" that she used to diagnose her "first pregnancy by observing the changes in my cervix." This appears to be another valuable skill American women have lost since home pregnancy tests, and one that could also be regained.

If we adopt a liberal feminist stance and concede that more choices are better and that commercially available, hormone-based kits will hold some benefit for some women under some circumstances, then we should work to improve them to better serve women. At present, although home pregnancy

tests measure hCG levels, they do not reveal the level to the user. Even the expensive digital ones do not tell women their hCG level, but only whether it is high enough to indicate that a pregnancy is likely. The actual hCG level (especially if tracked over time by repeating tests) can be an important indicator of many things, including whether a pregnancy is likely to end in miscarriage, is likely a multiple gestation (twins, triplets), or is likely to be an ectopic. Although there has been a significant drop in the death rate for ectopic pregnancy since the 1970s, forty to fifty women still die each year from ectopic pregnancy in the United States. In early pregnancy, hCG levels generally double every seventy-two hours; plateauing levels or an abnormal rise often indicates ectopic pregnancy. Putting this information in women's hands might save lives (http://www.advancedfertility.com/ectopic.htm).

In addition to this "hardware" change, there are improvements in the "software" that would help make these tests better feminist information technologies by providing women with information they need to make informed choices. The six brands I examined in 2008 included inserts that, along with directions and disclaimers, answered a pair of "what should I do if" questions. If the "test says I'm not pregnant," the inserts advise using another of their tests in a few days, and "if your period hasn't started in a few days," the woman should "go see your health care professional." If "the test says I'm pregnant" women are chided to "remember this is not intended to replace your doctor's diagnosis. . . . See your doctor to confirm your pregnancy" and to be advised "on what steps you should take next." First Response and its less expensive sister brand, Answer, also give three suggestions for "increas[ing] your chances for a healthy pregnancy."

None of the brands mentions abortion or even acknowledges that some of the users who are pregnant will want to keep the pregnancy and others will not, nor is the possibility of miscarriage brought up. Rather than simply referring women to a doctor, a feminist pregnancy test would provide women with information on spontaneous abortion, elective abortion, and best practices during the early weeks and months of a desired pregnancy and advise them about resources for getting more information on each of these topics. It also would provide information for women who discover they are not pregnant, and are relieved, about how to avoid such a scare in the future; for those who are disappointed, it would offer information about what this might mean and, if appropriate, direct women to infertility resources.

A good starting place for modeling the type of information that should be provided is in the 2005 edition of *Our Bodies, Ourselves* (BWHBC 2005,

384–88). If a woman was afraid she was pregnant and turned out not to be, *Our Bodies, Ourselves* advises that she find out if there are contraceptive methods better suited to her. The authors also advise how to get help if you are being sexually abused, how and where to get emergency contraception, and suggest that you talk with a family planning clinic. The book provides information for those who test positive and need to figure out what do. It addresses health insurance coverage, whom to turn to, family pressure and strong-willed partners, poverty, the special challenges of teen pregnancy, abortion, carrying to term, parenting, foster care, adoption, and where to get more information. This section of the book is about as long as the product inserts in the home pregnancy test kits; hence—such helpful information could easily be provided.

In addition to reskilling women so they know how to, and trust their ability to, read their own bodies and examine themselves, and besides improving existing home pregnancy tests by providing more information, there are other feminist interventions needed. Given that the benefit of early detection is assumed to be early abortion or early prenatal care, we should call for legislation that would mandate free testing to all women at publicly supported family planning clinics that would also provide confidential qualified counseling and publicly funded resources for abortion or prenatal care.[10]

CONCLUSIONS

As we have seen, the home pregnancy test has been massively adopted during the past twenty-five years as "the right tool for the job" (Casper and Clarke 1998) of figuring out whether or not one is pregnant. Yet despite the strenuous feminist analysis and critique of the medicalization of pregnancy and birth and of many of the new reproductive technologies, there has been almost no assessment of the home pregnancy test. Interdisciplinary feminist scholarship on new reproductive technologies has focused more on high-tech, costly technologies, such as assisted conceptive technologies, prenatal testing, fetal imaging, and fetal surgery. In science and technology studies too, low-tech products such as the home pregnancy test tend to be championed but rarely studied (except in the South, under the rubric of "appropriate technology.")[11]

The home pregnancy test represents a classic case of "technological somnambulism." We were sleepwalking and, without thinking, accepted a new technology that "reconstituted the conditions of [our] existence" (Winner 1986, 10). This seemingly simple little technology has changed the way

women experience infertility, pregnancy, abortion, and pregnancy loss. On the whole, these changes have not been advantageous, compared to the pre-existing status quo or with potential alternatives.

The case of home pregnancy tests highlights the need for systematic feminist technology assessment and the need to refine the criteria by which feminist technologies are judged. If we use the criteria that have been established among the international women's health activists for evaluating proposed forms of birth control, for example, that it is administered by the woman and has no irreversible consequences, the home pregnancy test looks like a winner. But as we have seen, a fuller understanding of the social circumstances under which women buy, use, and dispose of these technologies and the consequences of test use on women's sense of self, relationships, options, and actions are essential. Case studies like these provide a fruitful opportunity to develop a more close-grained model for designing, promoting, and evaluating feminist technologies.

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NOTES

1. There is a robust "gender and technology" literature that demonstrates how technology and gender shape and are shaped by each other. But as I show in the introduction to *Feminist Technology*, the notion that we might mindfully intervene to bring into being technologies that are feminist has been largely absent from this literature. That volume seeks to make feminism a design goal.

2. Unless otherwise noted, quotes come from the NIH website, A Thin Blue Line (n.d.). The stories collected are now housed at the webpage "Your Stories" (n.d.) as part of Exploring and Collecting History Online: Science and Technology Project at the Center for History and New Media at George Mason University. The pregnancy website is BabyCorner (2002); the pregnancy loss support newsletters are those of UNITE (1981–2004) and of SHARE (1984–2004). Demographic information is not systematically provided in any of these sources. At all three sites, first names tend to be used, so it is possible to share one's story with a fairly high level of anonymity.

3. For a full history of this, see Leavitt 2005.

4. The inserts of the six tests I examined were in English and Spanish. The Answer brand, a bargain brand from the same manufacturer as that of First Response, also has both languages on the outside of the box; none of the others did.

5. The products are CVS Early Result Pregnancy Test, CVS One Step Pregnancy Test, First Response Early Result Pregnancy Test, Answer Early Result Pregnancy Test, Clearblue Easy Digital Pregnancy Test, and e.p.t. Pregnancy Test.

6. Even women who wish to be pregnant, however, sometimes report resenting their loss of privacy while purchasing test kits.

7. Two of the six brands printed a table with these accuracy figures on the box; one (e.p.t.), in bold type, actually advised women to "wait until the day of your expected period." These results (53 percent accuracy four days before the first day of a missed period; 74 percent, three days before; 84 percent, two days before; and 87 percent, one day before) have not improved since at least 2005.

8. Makers claim 99 percent accuracy if used at this date but a 2001 article in the *Journal of the American Medical Association* addressing the "natural limits of pregnancy testing" accuracy disputes this claim. A pregnancy cannot be detected before the blastocyst implants and the timing of ovulation does not always occur in the middle of a menstrual cycle but may occur near the end. The authors argue that this means that "the highest possible accuracy for hCG-based tests is 90% on the first day of the missed period" (Wilcox et al. 2001).

9. Some report that they did not suspect, but others "knew." Some tell of their husbands or co-workers knowing before they did and buying the test for them based on that "knowledge."

10. Cunningham and his colleagues at the California Department of Health called for such legislation in 1976.

11. A similar observation was made by Casper and Clarke with regard to the Pap smear, one of the "supposedly simple technologies that are widely used" but understudied in the field of science and technology studies (1998, 156).

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